Jacksonville Air Route Traffic Control Center
Hilliard, Florida
Administration Wing Roof Sections "A" & "C"
Roof Replacement

SPECIFICATIONS

March 2010

Spec. # FAA-ZJX-900312

Prepared by: Federal Aviation Administration
ATO Tech Ops Engineering Services
Atlanta Enroute Unit

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DIVISION 16 - ELECTRICAL

16670 LIGHTNING PROTECTION

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SECTION 01000 GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 SCOPE

Scope - These specifications, together with referenced specifications, standards, construction drawings specified on the Contract Documents and the conditions of the Construction Contract cover the requirements of the Federal Aviation Administration (FAA) for the work associated with this project.

1.2 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

1.3 SEVERE WEATHER PREPAREDNESS PLAN

The contractor shall submit a Severe Weather Preparedness Plan that includes hurricanes and tropical storms. It should include items such as:

A. 48 hrs prior to a severe windstorm such as a tropical storm or hurricane the contractor shall begin to secure the site and protect the facility as it relates to the construction area from the elements. The site shall be cleaned and all items that may become airborne shall be secured, tied down or stored properly.

B. 24 hrs prior to a severe windstorm the contractor shall be prepared to evacuate the site for personnel safety.

C. The contractor shall be prepared to commence work within 24 hrs following a severe windstorm.

D. The Government would consider extending the contract based on the number of days the contractor is impacted by a severe windstorm. However, no additional compensation will be considered.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the COR for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the COR for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable industry standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 RECORD DRAWINGS

The Government shall provide the Contractor with an electronic copy of the record drawings in .PDF format. Changes to the original plans, drawings or shop drawings shall be annotated in red.

END OF SECTION 01000

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SECTION 01010 SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work - These specifications, together with the referenced specifications, standards, and drawings specified in the contract documents cover the requirements for the following work:

Remove existing build-up roofing down to the original roof deck. Remove flashing and metal caps on the walls surrounding the section. Replace three existing roof drains, exhaust vent and expansion joint. Remove an existing intake hood, including the curb. Cover the holes left by the curb removal with the same or better material as the existing metal deck roof. Weld the metal roof deck back to its original condition. Remove existing lightning protection system and conduits. Install new lightning protection system. Install new wood blocking and cants around perimeter and penetrations. Install new rigid insulation in multiple layers with a minimum LTTR of 30. Install a new Thermoplastic Polyolefin membrane roofing system to include flashing. Replace parapet copings.

The work is at the Jacksonville Air Route Traffic Control Center, (ARTCC) located in Hilliard, Florida. The General Contractor (GC) shall be expected to work during day times, 0700 AM to 0430 PM. Extensive coordination between the GC and FAA personnel shall be required at all times in order to maintain an operational facility. **Prospective bidders are strongly recommended to perform a site visit to assess the actual conditions before submitting a bid. Site visits should be arranged thru the Contracting Officer's Office.**

B. FAA Holiday Moratorium - No work shall be scheduled or take place during the week of and the weekend preceding and following: The Thanksgiving, Christmas, and New Years Holidays. Only emergency work to restore critical services to the Facility will be considered and a moratorium waiver must be submitted and approved. The moratorium period will not be counted against the contract construction duration of the project.

C. Intent of Specifications - This specification identifies all material, labor, and equipment required to perform this work. All work performed and all materials and equipment used are subject to approval by the Contracting Officer (CO) and /or the Resident Engineer (RE). This shall include but is not limited to inspection, scheduling, reporting and submittals.

D. Title - Titles to division and sections of the specifications and notes and titles on drawings referring to subcontractors, division of work by trade, or type of work, are introduced merely for convenience in reading the specifications and drawings and do not imply any separate contractual arrangements of work assignments. Such separations into titled divisions and sections shall not operate to make the Government an arbiter to establish subcontract limits between the contractor and subcontractors, or between the subcontractors themselves.

E. Contract Documents - The drawings, as shown on the "List of Drawings" in Attachment 2 in each specification package, General, Architectural, Mechanical, Electrical, and Southern Standards, all form a part of the construction requirements for this project. The renovation of these systems shall be in accordance with the lines and grades shown on the drawings. The Contractor shall not use dimensions scaled from drawings. All dimensions shown on the drawings shall be field verified by the contractor prior to any modifications and fabrications. Any discrepancies between the drawings

and specifications and the existing conditions shall be referred to the CO for adjustment before any work affected is performed.

F. Precedence of Contract Documents - In the event of a difference between the following Contract provisions, the order of precedence to determine which provision shall govern is:

1. Contract Clauses and Provisions
2. Project Specifications
3. Project Drawings

Any discrepancies between the contract provisions, the specifications and the contract drawings shall be referred to the CO for a written determination in accordance with Contract Clause entitled Order of Precedence.

G. Contracting Officer -The term "Contracting Officer" (CO) as used herein denotes the person designated to act on behalf of the Government in the performance of this contract. Where reference is made to "Federal Aviation Administration" (FAA), "Resident Engineer" (RE), "Contracting Officer's Representative" (COR), or the like, this shall mean the Contracting Officer or his/her authorized representative.

H. Contractor Superintendence - In accordance with Contract Clause entitled SUPERINTENDENCE BY THE CONTRACTOR, the Contractor shall at all times during performance of this contract and until the work is completed and accepted, directly superintend the work or assign and have on site a competent superintendent with the authority to act for the Contractor.

The Contractor shall submit a Project Organizational Chart with the key personnel identified and their qualifications for the Government's review and approval.

1.2 SPECIAL REQUIREMENTS

A. Asbestos Containing Materials. - **No new materials supplied by the contractor for this construction shall contain asbestos or lead-based products.** The contractor shall verify that all materials, including those supplied by third parties, are asbestos free and/or lead-based free materials.

1. Contractor certification requirements. - The contractor shall provide to the Contracting Officer (CO) a signed and notarized document stating that to the best of his/her knowledge, no asbestos containing or lead-based materials were used during the construction, renovation, and/or modernization of this facility.

2. Material Safety Data Sheets. - The contractor shall submit Material Safety Data Sheets (MSDS) with all submittals for review and approval by the Contracting Officer. New materials found to contain asbestos and/or lead-based products will be automatically disapproved. Copies of all MSDS sheets shall be provided to the facility FAA personnel for the building records. The contractor shall comply with all health and safety provisions outlined in each MSDS and shall follow all OSHA guidelines regarding personnel protection.

3. Hazardous materials.- If the FAA RE suspects the presence of asbestos or lead-based products in the new materials, the FAA will sample the suspect material to verify that no asbestos containing material or lead-based material were used. If these materials are found

to contain asbestos or lead-based products, the cost of the survey and all subsequent removal/replacement of any hazardous materials shall be at the contractors' expense.

B. Work plan and scheduling. – Prior to the Contracting Officer issuing the Notice to Proceed (NTP), the contractor shall submit for approval a plan and schedule of his work. This schedule shall include all of the requirements as defined in Section 01042 of this specification.

C. Sequence of work. - The contractor shall be responsible for scheduling all aspects of the work and coordinating among the different trades involved in the project. The contractor shall follow the guidelines outlined in the sequence of work as described in the contract drawings. The Federal Aviation Administration has developed a list of milestones that the contractor shall be required to meet.

D. Construction Activities and Milestones. – Construction Activities and Milestones below shall be included in the submitted schedule. They are provided for guidance, but are not intended to direct how and when contract activities shall be ordered or take place in the submitted schedule.

1. Submittal Approval
2. Order Long Lead Items
3. Notice to proceed
   -Scheduled by the FAA's CO
4. Established protection of personnel and equipment
5. Complete demolition
6. Thermoplastic Polyolefin Roofing
7. Flashing and Sheet Metal
8. Roof Warranty
9. Close Job

E. Driveway Closures - Contractor shall maintain access to the loading dock at all times.

END OF SECTION 01010

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SECTION 01030 SITE ACCESS, CONSTRUCTION LIMITS, USE OF FACILITIES AND WORK HOURS

PART 1 – GENERAL

1.1 SUMMARY

A. Existing facility operations. - Construction/demolition shall in no way interfere with Air Traffic Control Operations. The ARTCC is a 24 hour, seven day a week facility. Extreme care shall be exercised so as not to cause any interference or interruption of service from this facility. Controller functions are vital to the safety of the flying public. It is absolutely mandatory that the contractor protects FAA personnel and existing FAA communication, electrical and mechanical equipment both inside and outside buildings from damage caused by impact, water, debris, dust or odor. The contractor shall have the overall responsibility for the performance and enforcement of all forms of protection within the ARTCC premises against any damages due to work performed under this contract. Any damages incurred, as a result of construction activity during the performance of this contract will be repaired/replaced immediately by the contractor at no cost to the FAA.

Any work or activity that may impact the National Airspace System (NAS), such as work on critical equipment or circuits, will require coordination with the Contractor Office Representative (COR). The COR will prepare and submit a work or activity specific "Risk Assessment" for the facility's review and approval. This process may take one week to complete. Typically, this type of work or activity is performed from midnight to 05:00 AM and/or on weekends. Additionally excessively noisy activities, those which might adversely impact Air Traffic operations, shall be performed between the hours of midnight to 05:00 A.M.

B. Construction limits and access. -

1. Construction limits.- The contractor shall confine operations, activities, storage of materials and employee parking within the designated areas, as indicated on the construction staging plan, or as designated by the COR. Additional space the contractor deems necessary shall be obtained off site, at no additional cost to the Government.

2. Access. - Access route for the contractor, subcontractors, employees, deliveries, etc., shall be as designated by the COR. Access to all, parking areas, and loading dock shall be kept unobstructed. If temporary access obstruction is unavoidable, the contractor shall advise the COR immediately. Vehicles transporting materials shall not be loaded beyond the capacity prescribed by federal, state, or local laws. Obstruction of existing roadways, driveways, to the ARTCC is strictly prohibited.

3. Damage to site. - Damage to existing paving, lawns, curbs, sidewalks, and utilities caused by the contractor's activities shall be repaired immediately. Any damage to the building, interior or exterior, that are a result of the contractor's activities shall be repaired. All costs of repairs shall be paid by the contractor. After notice to proceed and prior to the commencement of construction, the contractor and COR shall conduct joint inspections of the existing areas affected by the construction. Existing damage or defects shall be noted and will be used as the basis for determination of damages caused by the contractor's operations.

4. Cafeteria. - The Contractors' employees shall not use the Cafeteria.

C. Inspection of site by contractor. - It is strongly urged that the contractor carefully examine the premises to determine the extent of work and the conditions under which it must be done.

D. Government use and access to premises. - The Government reserves the right to enter the construction area at any time for work inspection and for the operation of the facility.

E. Work hours. - All work hours, shifts, and overtime work shall be coordinated with the COR. Before commencing construction, furnish to the COR a statement of hours per day and days per week to normally be worked and approximate number of persons on the job for a normal work shift.

F. Security requirements.

1. Personnel List. - Contractor shall provide the COR with a list of contractor personnel who require access to the ARTCC. The list shall be submitted immediately after contract award. The list shall be kept current during the project and shall include the following:

   Full name, including middle initial
   Federal or State issued photo ID
   Date of Birth
   Place of Birth

2. Security Investigation and identification. - Contractor's personnel may be subject to security investigation by FAA. The contractor shall promptly complete all security forms provided by the CO. Contractor's personnel shall report to the FAA security guard at entrance to the facility and submit proper identification when signing in to obtain an FAA badge which will be worn on an outside garment, above the waist and below the neck, facing forwards, at all times while on the ARTCC premises. This badge shall be returned daily to the security guard when leaving the premises, unless otherwise noted. The Contractor is responsible for providing badged personnel to escort all their workers.

3. Vehicle identification. - Vehicle identification tags will be issued for contractor's and contractor's employees' vehicles that require access into the ARTCC site. The identification tags shall be displayed in the windshield of the vehicle at all times when the vehicle is on the site. The contractor shall be responsible for the collection and return of all vehicle tags which are no longer required.

4. Escort requirement. - Contractor is responsible to provide a badged escort for his employees. This will required a security background investigation by the FAA. Contractor's personnel shall not violate any security regulations pertaining to the ARTCC facility. Violators may be removed from the premises with the right to reenter revocable. Contractor's day-to-day work schedules in the classified areas shall be so arranged to allow for minimum escort.

5. Right to search. - Current procedures at FAA facilities include the "right to search." If in the judgment of the FAA a cause to search a vehicle or the person of personnel exists, such search will be made.

6. Replacement of lost identification. - The FAA will provide personnel badges and vehicle identification tags as described above. It is the contractor's responsibility to return these badges and tags daily and upon completion of the project. The contractor shall be liable to pay for any FAA badge or tag not returned or replaced at the completion of the work. The payment for lost I.D. will be $10.00 for each and every tag or badge not returned or replaced, excluding temporary badges.

7. Physical Security. - At the end of each work day, the contractor shall secure all construction areas by closing and locking all doors and gates. The contractor is responsible for the security of the staging area, and shall provide the required measures at no additional expense to the government.

END OF SECTION 01030

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SECTION 01040 COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

A. Project coordination. - It shall be the duty of the Contractor to prepare a detailed schedule of work and work layout to resolve conflicts and to assure coordination of the work by different trades.

B. Weekly Meeting. - Coordination between the COR and Contractor shall take place weekly at the site. Special meetings will be scheduled if requested by either the COR or Contractor. The subjects to be discussed at the progress meetings shall included, but are not limited to, the following:

-Safety concerns/Issues
-Progress of Work
-Previous meeting action items/issues
-Field problems
-Material and Equipment delivery status
-Submittal status/schedules
-Progress planned during the upcoming week(s)
-Review of changes, and potential effects on the schedule
-Construction schedule revisions
-Schedule Revisions
-Other current business

The following persons will be expected to attend meetings; FAA COR, Prime Contractor Superintendent, Project Manager and Project Manager/Superintendents for other major trades.

C. Facility Coordination Meeting. - Weekly coordination meeting shall take place between the facility managers, COR and the Contractor's Project Superintendent.

D. Work Affecting Operational Systems. - The contractor shall coordinate all work which has any or may have any impact on any operational system within the facility through the COR. The contractor shall immediately cease any work which is adversely impacting the operation of the ARTCC and shall immediately repair or restore any portion of the operational system that has been damaged or suffered diminished performance as a result of the contractor's activities.

E. Local permits and Coordination. - The Contractor will be responsible for obtaining and payment of all building fees, inspection fees, utility connection charges and any other fees or charges which may be incurred in the performance of this contract.

F. Applicable documents. - The contractor shall comply with all local city, county, and state construction codes.

END OF SECTION 01040

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SECTION 01042 CONSTRUCTION SCHEDULES

PART 1 – GENERAL

1.1 SUMMARY

A. Description. - The work plan and schedule prepared by the contractor shall consist of a Gantt and Pert chart(s) and logical narrative plan. The charts shall show all significant activities and shall include detailed activities when critical work is to be performed. The schedule shall include the sequence shown in Section 01010 1.2. D

1.2 PRODUCTS

A. Diagrams -

1. Show the order of the activities.
2. Include construction activities, the submittal and approval of materials, samples and shop drawings, the procurement of critical materials and equipment, fabrication of special materials and equipment along with their installation and testing, and costs associated with each activity in the bar chart.

B. Progress Schedules. - Within 30 calendar days of contract award, the contractor shall submit the schedule and work plan. **A Notice to Proceed will not be issued until the schedule is approved.**

1.3 EXECUTION

A. Review and Evaluation. - The Contractor shall participate in a review and evaluation of the proposed schedule with the Contracting Officer. Any revisions necessary as a result of the review shall be re-submitted for approval of the Contracting Officer within 14 days after the conference. The approved schedule shall then be used by the contractor for planning, organizing, and directing work, reporting progress, and requesting payment for work accomplished. If the contractor, thereafter, desires to make changes in the schedule, the Contracting Officer shall be notified in writing, stating the reasons for the change. If the Contracting Officer considers the change to be of a major nature, the contractor may be required to revise the schedule and submit it for approval, without additional cost to the government.

B. Monthly Update. - The contractor shall meet with the COR at monthly intervals to discuss the construction progress. If the project is behind schedule and requires a change in the schedule, the contractor shall submit a revised schedule with a description of the delaying factors and their impact, and an explanation of corrective actions taken or proposed.

C. Payment. - The monthly update shall show the activities or portions of activities completed during the reporting period, and their total value will be the basis for the contractor's periodic request for payment. Payment will be based on the total value of such activities completed or partially completed after verification by the Contracting Officer.

D. Submission Requirements. - Schedule charts shall be on (minimum) 11" x 17" size paper. Update charts shall show the date of the latest revision. Schedule charts with revisions and monthly updates shall be submitted in three copies.

E. Requirements for Schedule Chart. -

1. Activities.- The significant activities to be included in the schedule chart shall include, but not be limited to:
   a) The milestones listed in Section 01010 1.2. D.
   b) Any system shutdowns or cut-overs
   c) Any other significant activities the contractor or FAA feels necessary.

2. Format - Contractor shall use Microsoft Project, cost loaded. A minimum of 30 activities should be included.

F. Acceptance and Warranties

1. The Contractor shall warranty Its work as indicated on Section 07543,1.8.

END OF SECTION 01042

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SECTION 01300 SUBMITTALS

PART 1 – GENERAL

Applicable provisions of this Section and other provisions and requirements of the Contract Documents apply to all sections, except as modified in Sections of Divisions 2 through 16.

1.1 SUMMARY

Submit Shop Drawings, product data, samples, warranties, certificates, test reports and third party disposal letters as required by the contract documents.

1.2 RELATED REQUIREMENTS

A. Section 01040: Coordination and Testing

B. Section 01651: Materials and Equipment

C. Section 01800: Closeout Procedures

1.3 SUBMITTALS

Submittals required include, but are not necessarily limited to, the following:

A. Submittal schedule

B. Construction progress schedule

C. Themoplastic Polyolefin Roofing

1.4 SUBMISSION REQUIREMENTS

A. Number of Copies - Submit in ample time for approval before installation. Unless otherwise noted, submit five (5) copies of documents to the Resident Engineer (RE). Three (3) copies will be retained by the RE. If additional copies are required, provide the quantity and submit additional copies to meet this requirement.

B. Time for Approval - Receive submittal approvals prior to starting the work. Time necessary for government approval or disapproval of samples, certificates, test reports, and shop drawings will not be more than thirty (30) calendar days after receipt of a submittal. All materials installed in the work shall match the approved submittals. After a submittal has been approved, no substitutions will be permitted without written approval by the RE. No extension of Contract Time will be authorized because of failure to transmit to the RE sufficiently in advance of the Work to permit processing.

C. Submittal Approval - The checking, marking or approval of the submittal by the FAA shall not be construed as a complete check, but will indicate only that the product or method of construction and detailing is satisfactory. Approval will not relieve the contractor of the responsibility for compliance with the specifications or for any error

which may exist. The Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Possible approval actions taken by the FAA include:

1. Approved as submitted - If "approved as submitted" is marked by the RE, each copy of the submittal will be identified as having received such approval by being stamped and dated. After submittal has been approved, no substitutions will be permitted without written approval by the RE.
2. Approved as noted - If "approved as noted" is marked by the RE, the submittal is satisfactory contingent upon Contractor acceptance of corrections, notations, or both, and if accepted, does not require resubmittal.
3. Not approved - If "not approved" is marked by the RE, the submittal data does not meet job requirements and the Contractor must resubmit. If the submittal is disapproved, the Contractor shall resubmit the corrected material in the same quantity as specified for the original submittal. Correct disapproved submittals and resubmit for approval by the RE. Approval of resubmittals require an additional fourteen (14) calendar days.
4. Submittal Schedule - Identify within the Contractor's Construction Schedule a schedule of submittals for shop drawings, material approval, etc., showing the dates when submittals will be submitted for the project.
   a) Contents - On the schedule indicate the following information:
      1) Schedule date for submittal
      2) Related Section number.
      3) Submittal category (Shop Drawings, Product Data, or Samples).
      4) Name of the subcontractor (if applicable)
      5) Description of the part of the Work covered.
5. Distribution - Following response to the initial submittal, print and distribute copies to the RE, Government, subcontractors, and other parties required to comply with submittal dates indicated. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
6. Schedule Updates - Revise the schedule after each meeting or activity where revisions have been recognized or made.

D. Construction Progress Schedule – The progress chart to be prepared by the Contractor pursuant to the Contract Clause entitled "SCHEDULES FOR CONSTRUCTION CONTRACTS" shall consist of network analysis system, or pertchart (barchart). The contractor shall be required to complete the work within the contract time limits after receipt of Notice to Proceed excluding the FAA holiday moratorium as specified in section 01010.

1. Contractor shall use Microsoft Project, cost loaded. A minimum of 30 activities should be included.

2. The diagram shall show a continuous activity flow from left to right. The diagram shall show the sequence in which the work is to be accomplished as planned by the Contractor.

3. Dates shall be shown on the diagram for start of the project, any milestones required by the contract, and contract completion.

4. The critical path shall be clearly identified.

5. Network activities shown shall include submittal and review of shop drawings and samples and procurement of materials and construction activities.

6. Government activities that affect progress shall be shown. These include but are not limited to: Notice-to-Proceed, approvals, and inspections.

NO PHYSICAL CONSTRUCTION WORK AT THE SITE MAY TAKE PLACE UNTIL THE CONTRACTOR SUBMITS AND THE GOVERNMENT APPROVES THE SCHEDULE. Government review of schedule submittal(s) will not exceed thirty (30) calendar days. Resubmittal, if necessary shall not exceed fourteen (14) calendar days.

E. Two-week "Look Ahead" schedule - This schedule may be of the contractor's choosing, either bar chart or CPM form. Only activities scheduled to be occurring during the forecasted two week time periods are to be shown. Schedules shall be submitted weekly. Early and Late Start and Finish dates, and subcontractors involved are data to be included in the schedule.

F. Submittals - Submit shop drawings, material and equipment lists, and all other data required under various headings of these specifications necessary to permit commencement of work. RE will return the submittals within 30 calendar days after receipt, indicating approval or disapproval.

G. Submittal Preparation - Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Transmittals - All submittals shall be accompanied by transmittal letters identifying the contents of the submittal. It shall be clearly indicated on the transmittal letter with a statement and signature of the Contractor that the submittal item was verified for compliance with the contract requirements and approved by the Contractor. Transmittal letters shall consist of one original.

2. Contents - Submittals shall be complete and detailed and assembled into sets. Lack of completeness or clarity or inadequate description will be justification for disapproval. Submittals shall bear the following information:

a) Name of project or facility and contract number;

b) Date of submission;
c) Contract drawing number and latest revision;
d) Specification page and paragraph number;
e) Name of contractor and subcontractor or supplier/manufacturer;
f) Clearly identified contents and location of work;
g) Any proposed variances to specification requirements;
h) Contractor's approval certifying he checked and coordinated the work of other trades.

1.5 SHOP DRAWINGS

A. Applicable Documents -

B. Presentation - Present drawings in a clear and thorough manner. Identify details by reference to sheet and detail, building wing and section shown on contract drawings.

1. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings.

C. Contents - Provide the following information on each submittal:

1. Submittal number (paragraph 2.1 of this Section) and identify as "Part A" or "Part B" item
2. Date of submission
3. Name of project and facility (full name)
4. Name of Contractor or Subcontractor
5. Reference to drawing number (with revision, if applicable) and/or specification section.
6. Clearly identify contents and location of work.
7. Contractor's approval certifying he checked and coordinated the work of other trades.
8. Dimensions.
9. Identification of products and materials included by sheet and detail number.
10. Compliance with specified standards.
11. Notation of coordination requirements.
12. Notation of dimensions established by field measurement.
13. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.

D. Submittal - Submit blue- or black-line prints for the RE's review. Submit five copies, of which three will be retained by the RE.

1. One of the prints returned shall be marked up and maintained as a "Record Document."
2. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.6 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, Material Safety Data Sheets (MSDS), standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves, for all materials brought on site.

B. Preparation

1. Clearly mark or highlight each copy to identify pertinent site specific products or models the Contractor intends to use
2. Highlight/clearly indicate all performance characteristics and capacities
3. Highlight/clearly indicate all dimensions and clearances required

Note: If the submittal is not clearly marked, regarding the above pertinent data, the submittal will be returned marked "DISAPPROVED".

1.7 WARRANTIES/GUARANTIES

A. Assemble two (2) copies with original signatures of warranties executed by each of the respective manufacturers, suppliers, and subcontractors into a warranty book and prepare a Table of Contents.

B. Additional Data - Provide complete information for each item, include the following:

1. Product or work team
2. Firm, with name of principal, address, and telephone
3. Scope
4. Effective dates of warranty based on Final Acceptance of the item.
5. Information for owner's personnel on proper procedures to evoke the warranty in case of failure and instances which might affect the validity of warranty

C. Warranties - Effective after project completion and acceptance by the FAA.

1.8 CERTIFICATES

Assemble certificates executed by each of the respective manufacturers, suppliers, and subcontractors.

A. Additional Data - Provide complete information for each item to certify compliance with contract documents.

1. Product or work item

2. Firm, with name of principal
3. Scope of compliance
4. Signature by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

PART 2 – MATERIAL

NOT USED

PART 3 – EXECUTION

3.1 GENERAL

Submittals are required for, but not limited to, the items listed in the specifications or on the drawings. The following is a partial list of submittals required: Schedules, Manufacturer's Literature, Shop Drawings, Samples, Test Reports, Warranties, Certificates, Design Calculations, MSDS, and Installation Instructions. This list should not be construed as a complete list of all submittals required. Submittal dates shall comply with this specification unless a more stringent date is specified. Substitutions and all requested changes will require a submittal.

3.2 SCHEDULE FOR CRITICAL SUBMITTALS

Process after the construction contract has been awarded and prior to NTP:

All Critical Submittals are due 30 calendar days after the contract has been awarded. See below for a list of critical submittals. The construction Notice to Proceed (NTP) will not be issued until all critical submittals are approved. All other submittals shall be submitted and approved prior to installation or construction. Critical submittals include the following:

1. Section 01300- Construction Schedule
2. Section 07543- Thermoplastic Polyolefin (TPO) Roofing
3. Section 07600- Flashing & Sheet Metal

No later than two weeks after the contract has been awarded, the Contractor shall be available to participate in a meeting/telecom with the Contracting Officer, Resident Engineer and Office Project Engineer to discuss and coordinate the following:

1) Contractor's FAA point of contact for submitting the Critical Submittals.
2) Discuss the submittal process and forms.
3) Discuss process and forms for request of FAA security badges.
4) Discuss the proposed date for Notice to Proceed (NTP)

PART 4 – QUALITY ASSURANCE

NOT USED

* * * **END OF SECTION** * * *

SECTION 01651 MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1-1 SUMMARY

A. General. - Material and equipment incorporated into the work shall conform to applicable specifications and standards and comply with size, make, type and quality specified, or as specifically approved in writing by the COR. Manufactured and fabricated products shall be designed, fabricated and assembled in accordance with the best engineering and shop practices. Like parts of duplicate units shall be manufactured to standard sizes and gages and shall be interchangeable. Two or more items of the same kind shall be identical and manufactured by the same manufacturer. Products shall be suitable for service conditions. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing. Do not use material or equipment for any purpose other than for which it is designed or specified. Furnish and install products specified, under options and conditions for substitution stated in this section.

1. Manufacturer's instructions.- When contract documents require that installation of work shall comply with manufacturer's printed instructions, copies of such instructions shall be distributed to parties involved in the installation, including two copies to the COR. Maintain one set of complete instructions at the job site during installation and until completion. Products shall be handled, installed, connected, cleaned and conditioned in strict accordance with such instructions and in conformity with specified requirements. If job conditions or specified requirements conflict with manufacturer's instructions, the contractor shall consult with the COR for further instructions. All work shall be performed in accordance with manufacturer's instructions. No preparatory step or installation procedure shall be omitted unless specifically modified or exempted by contract documents.

2. Transportation and handling. - Products shall be delivered in undamaged condition, in manufacturer's original containers or packing, with identifying labels intact and legible. Shipments shall be inspected to ensure compliance with requirements of contract documents and approved submittals, and products are properly protected and undamaged immediately on delivery. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packing.

3. Storage. - Unless specified, products shall be stored in accordance with manufacturer's instructions, with seals and labels intact and legible. Products subject to damage by the elements shall be stored in weather tight enclosures.

4. Temperature. - Temperature and humidity shall be maintained within the ranges required by the manufactures instructions. Fabricated products shall be stored above the ground, on blocking or skids to prevent soiling or staining. Products which are subject to deterioration shall be covered with impervious sheet coverings and adequate ventilation shall be provided to avoid condensation.

5. Substitutions. - A separate request for each substitution shall be submitted. Each request shall be supported with complete data substantiating compliance of proposed substitution with the requirements stated in the contract documents. Each request shall include product identification, manufacturer's literature including address, product description, reference standards and performance and test data. Samples shall be submitted as applicable. An

itemized comparison of the proposed substitution with the product specified shall be included. The following information shall also be included: data relating to changes in the construction schedule; list of changes required in other work or products; and accurate cost data. Substitute products shall not be ordered or installed without written acceptance. In making a formal request for substitution, the contractor represents that he has investigated the proposed products and has determined that it is equal to or superior in all respects to that specified. The contractor ascertains that he will provide same warranties or bonds for substitutions as for product specified. That he will coordinate installation of accepted substitution into work to be complete in all respects; that he waives claims for additional costs caused by substitution which may subsequently become apparent; and that cost data is complete and includes related costs under his contract. Primarily, an "or equal" product will not be considered a substitution. If an actual substitution is accepted, it shall be done only by formal contract modification and not by a submittal approval.

6. New equipment and materials – All contractor supplied materials and equipment that will remain in the government's custody after contract completion, shall be new. Refurbished and or used equipment and materials are disallowed for construction purposes under this contract.

END OF SECTION 01651

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SECTION 01652 PROTECTION OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements Included. - It shall be the Contractor's responsibility to provide protection of work from weather, physical damage, improper use, and other adverse natural conditions. It shall be the responsibility of the Contractor to replace any damaged work including finishes, material, and equipment.

1.2 RELATED REQUIREMENTS. - The Respective Section of the Specification covering items of work.

Section 01651: Materials and Equipment
Section 01710: Cleaning

A. Protection during Installation.

1. Sleeves. - Provide watertight closures for sleeve openings below grade.

2. Building Openings. - Provide protection of temporary openings in the building to completely protect the contents and enable work to progress, during winter and all weather conditions. The method and means shall be subject to approval by the COR.

3. Base Materials. - Provide protection of base materials to receive finishes from physical damage.

4. Protection after Installation. - Provide protection of installed products and finished surfaces to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

5. Floors and Stairs.- Protect finished floors and stairs from dirt and damage:

(a) In areas subject to foot traffic, secure heavy sheathing in place.
(b) For movement of heavy products, lay planking or similar materials in place.
(c) For storage of products, lay tight wood sheathing in place.

6. When some activity must take place in order to carry out the contract, obtain and abide by recommendations of installer for protection of surface. Remove upon completion of the activity.

END OF SECTION 01652

* * * *

SECTION 01710 CLEANING

PART 1 - GENERAL

1.1 SUMMARY

The scope of this project will be performed in on an outside environment. All prospective bidders are encouraged to visit the project site to ascertain the criticality of maintaining a clean and dust free environment.

A. Requirements Included.

1. Execute cleaning during the progress of work.
2. Execute cleaning for final inspection.
3. Execute cleaning at completion of the work.

1.2 RELATED REQUIREMENTS

Section 01651: Materials and Equipment
Section 01800: Contract Closeout.

1.4 EXECUTION

A. Disposal Requirements. - Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

B. Final Cleaning.
1. Broom clean exterior paved surfaces, repair damaged sod areas with sod and rake. Clean other surfaces of the grounds.
2. Prior to final completion, or owner occupancy, Contractor shall conduct an inspection of interior and exterior surfaces, and all work areas to verify that the entire work is clean.

C. During Construction. - Maintain all areas under Contractor's control free of extraneous debris. Conduct a specific maintenance program to prevent accumulation of debris at the construction site, storage and parking areas, and along access roads and haul routes.

D. ARTCC Operational Areas. - Clean up after each work shift.

E. Debris Collection. - Provide containers for debris deposit and schedule periodic collections and disposal of debris. Provide additional collections whenever the periodic schedule is inadequate to prevent accumulation.

END OF SECTION 01710

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SECTION 01730 - OSHA SAFETY REQUIREMENTS

PART 1 – GENERAL

1.1 SCOPE

A. This section identifies some of the requirements of the OSHA Construction Standard.

B. Formulation of a site specific safety plan

1.2 CONTRACTOR RESPONSIBILITY

A. General Safety Provisions - The Contractor shall bear full responsibility to provide safe working conditions for its employees and Contractors. The Contractor shall not permit any employee or Subcontractor to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to the health and safety of the employee.

B. Accident Prevention - The Contractor shall bear the responsibility of maintaining an accident prevention program such that frequent and regular inspections of the job site, materials and equipment are made by a competent person designated by the employer.

C. Use of Equipment - The Contractor shall not permit the use of any machinery, tool, material, or equipment that is not in compliance with OSHA regulations. The employer shall permit only those employees qualified by training and/or experience to operate equipment and machinery.

1.3 SUBMITTALS

A. Submittals required include, but are not necessarily limited to, the following:

1. Contractor Safety Plan

1.4 CONTRACTOR RESPONSIBILITY

A. The FAA shall not be held responsible for safety inspections to assure Contractor conformance with the OSHA safety regulations. The FAA, however, reserves the right to notify the Contractor of any deficiencies regarding worker safety.

B. The FAA will evaluate the Contractor on its safety performance, including that of its Subcontractors. The number and severity of safety and security violations will be considered in this evaluation. Contractor safety violations are cause for termination for default, may result in notification of the Contractor's bonding company, and will affect the Contractor's opportunity to propose on future work. Failure to correct such deficiencies may impact the Contractor's ability to work on future FAA contracts.

1.5 OSHA REGULATIONS

A. The Contractor shall comply with the latest Occupational Safety and Heath Administration regulations (CFR 29 Part 1926) regarding safety in the work area.

B. The Contractor shall be responsible for obtaining copies of non-FAA referenced documents without additional cost to the FAA. If Contractor requests a copy of FAA directives, they may be obtained by contacting the Contracting Officer.

C. The Contractor is not relieved from adhering to other OSHA requirements not listed herein. The Contractor shall consult the latest referenced OSHA documents for safety regulations.

1. Documents:
   a) OSHA Documents:
      1) CFR 29 Part 1926Safety and Health Regulations for Construction
      2) CFR 29 Part 1910 General Industry Standards Applicable to Construction Industry
   b) FAA Documents:
      1) FAA Order 3900.49 Control of Hazardous Energy During Maintenance, Servicing and Repair

1.6 SAFETY PLAN

The contractor must develop and implement a site specific comprehensive Health and Safety Plan (HASP) based on the scope of work, for his or her employees as well as others in the area and the properties around. It shall cover all aspects of onsite construction operations and activities associated with the contract. This plan must comply with 29 CFR 1926, FAA Order 3900.19B, other applicable health and safety regulations and any project-specific requirements. The contractor must provide the Contracting Officer with a copy of this plan. Acceptance of the contractor's HASP only signifies that the plan generally conforms to the requirements of the contract. It does not relieve the contractor of the responsibility for providing with a safe and healthful work environment. At a minimum the HASP shall address the following:

A. Workplace address

B. Name and address of the principal contractor

C. Key Personnel, phone nos and addresses

D. Estimated duration of the work

E. Hazard assessment and identification of the hazards in the scope of work

F. Mitigation of hazards and proposed control measures for the risks

G. Hazard Communication methods

H. How the controls will be implemented

I. Personal Protective Equipment

J. Training

K. Temperature Extreme

L. Medical Surveillance

M. Site Control

N. Emergency Response/Contingency Plan

O. Emergency Action Plan

P. Documentation and Record Control

Q. Lock-out and Tag-out

The plan must be written so it is easy to understand, signed and dated by the General Contractor. It must be available for the length of the project. The General Contractor cannot allow work to start unless the plan has been discussed with or a copy given to all relevant people and the plan is readily available for inspection. The plan must be amended if there are changes in how risks will be managed. The General Contractor must inform any affected person of the change.

PART 2 – MATERIAL

NOT USED

PART 3 – EXECUTION

3.1 CFR 29 PART 1926 - SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

A. This section contains a partial listing of the referenced OSHA standards. The Contractor is responsible for adhering to all applicable regulations including those not specifically referenced herein.

1. Subpart D (Occupational Health and Environmental Controls) - Contractor shall furnish adequate supply of potable water in containers clearly marked as potable water. Containers containing non-potable water shall be clearly marked. Contractor shall furnish toilet facilities based on the number of employees present on the job-site. A minimum of 1 facility is required for less than 20 employees. See CFR 29 Part 1926 Subpart D for complete requirements.
2. Subpart E (Personal Protective Equipment) - The Contractor shall provide adequate protection for the head, hearing, and eyes for all employees working in an area where hazards to the head, ear and eyes exist. See CFR 29 Part 1926 Subpart E for complete requirements.
3. Subpart I (Tools) - All hand tools and power tools and similar equipment whether furnished by the Contractor or the employee shall be maintained and operated in a safe condition. Personal protection shall be used when applicable.

The use of tools shall be limited to the intended use of said tools. See CFR 29 Part 1926 Subpart I for complete requirements.

4. Subpart K (Electrical) - The Contractor shall furnish ground fault protection for all electrical equipment used on the jobsite. Extension cords shall be three wire ground in good shape. Installation of the facilities will require energizing numerous circuits. The Contractor shall protect against electrical shock by methods such as posting warning signs, supplying insulated gloves, locking out and tagging de-energized circuits, and other similar methods. See CFR 29 Part 1926 Subpart K for complete requirements.

3.2 CFR 29 PART 1910 - GENERAL INDUSTRY STANDARDS APPLICABLE TO CONSTRUCTION INDUSTRY

A. This section contains a partial listing of the referenced OSHA standards. The Contractor is responsible for adhering to all applicable regulations including those not specifically referenced herein.

1. Section 1910.147 - Contractor shall maintain a written hazardous energy control procedure in accordance with CFR 29 1910.147. The written procedure shall describe contractor's responsibilities regarding shift changes or personnel changes. A specific coordinated lockout/tagout procedure shall be recorded in writing and signed by the Contractor and Contracting Officer with copies to each party.
2. Section 1910.120 - The Contractor shall develop and implement an Emergency Response and Contingency Plan in accordance with OSHA Standard 29 CFR 1910.120. In the event of an emergency associated with remedial action, the Contractor shall, without delay, take diligent action to remove or otherwise minimize the cause of the emergency; alert the Contractor; and institute whatever measures might be necessary to prevent any repetition of the conditions of actions leading to, or resulting in, the emergency. Emergency contact names and telephone numbers shall be posted at all project phones and in site-support vehicles as well as included within the plan.

PART 4 – QUALITY ASSURANCE

NOT USED

* * * END OF SECTION 01730 * * *

SECTION 01800 CONTRACT CLOSE OUT

PART 1 - GENERAL

1.1 SUMMARY

The contractor shall require each subcontractor engaged upon the work to bear full responsibility for cleaning up during and immediately upon completion of his work. All rubbish, waste, tools, equipment and other apparatus caused by or used in the execution of his work shall be removed. This shall in no way be construed to relieve the contractor of his primary responsibility for maintaining the building and the site clean and free of debris, and leaving all work in a clean and proper condition acceptable to the COR. All exposed floor surfaces shall be protected against all mechanical damage, mortar or plaster droppings, oil, grease, or other damage that will stain or soil the finish. Protection shall be maintained until all work has been completed.

A. Rubbish removal. - Immediately after unpacking, all packing material, case lumber, wrappings, or other rubbish, flammable or otherwise, shall be collected and removed from the building and the premises.

B. Overall cleaning.- Immediately before the final inspection, the entire exterior and interior of the building and the surrounding areas shall be thoroughly cleaned by the contractor, including but not limited to the following:

1. All construction facilities, debris and rubbish shall be removed from the building and the site.
2. All finished surfaces disturbed by this construction shall be swept, dusted, vacuumed, washed or polished as required.
3. All tools, scaffolding, temporary utility connections or buildings, belonging to the contractor or used under his direction shall be removed from the site.

1.2 PROJECT RECORD DOCUMENTS

A. Maintenance of documents.- The following documents shall be maintained at the project site:

1. Contract drawings
2. Contract specifications
3. Addenda
4. Reviewed shop drawings
5. Change orders
6. Field test reports
7. Project correspondence
8. Software information specific to this project
9. Other modifications to contract

B. Storage and use of documents. - Store record documents apart from documents used for construction; do not use record documents for construction purposes. Keep documents in clean, dry, legible condition; provide file cabinets and racks for storage of drawings.

C. Marking devices. - Use red colored pencil for all marking.

D. Recording and labeling. - Label each document "Project Record" in 1-inch high printed block letters. Keep record documents current. Do not conceal or cover up any item of work until the information has been recorded.

E. Submittals. - At completion of project, deliver record documents to COR. Accompany submittal with transmittal letter containing the following:

1. Date
2. Project title and number
3. Contractor's name and address.
4. Title and number of each record document
5. Certification that each document as submitted is complete and accurate.
6. Signature of contractor, or his authorized representative

1.3 CONTRACT DOCUMENTS

A. Contract drawings.- Legibly mark to record actual construction:

1. Field changes of dimension and detail.
2. Changes made by change order or field order.
3. Details not on originally specified drawings.

B. Contractor specifications and addenda.- Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each item of equipment actually installed.
2. Changes made by change order or field order.
3. Other matters not originally specified.

C. Shop drawings. - Shop drawings shall be maintained as record documents; legibly annotate drawings to record changes made after review.

1.4 COMPLETION CERTIFICATE

When the contractor considers the work complete, the contractor shall submit written certification that contract documents have been reviewed and work has been inspected by RE for compliance with contract. Second the contractor also certifies that the work is completed, premises cleaned and ready for inspection; and the warranty certificates from all new work have been provided.

1.5 FINAL INSPECTION

A written request for a final inspection shall be sent to the Resident Engineer fourteen (14) calendar days prior to the requested inspection date. The final inspection shall be scheduled at a mutually agreed upon date, and will be acknowledged by the Resident Engineer. The contractor shall develop his own pre-final inspection and correct all deficiencies prior to requesting the final inspection. The pre-final report shall accompany the final inspection request.

If, during the final inspection, the Resident Engineer, in concurrence with the inspection team and the Contracting Officer, determines that the contractor was not ready for the final inspection, based on the contractor not meeting all of the contractual requirements, all costs incurred by the Government for additional inspections shall be deducted from the contract (including but not limited to: travel cost,

per diem, salaries of all concerned parties, consultant engineer personnel, and FAA personnel required to participate in the final inspection). This dollar amount shall be the actual cost incurred by the FAA to perform the final inspection.

1.6 PUNCH LIST

During the final inspection, the Resident Engineer, in coordination with the regional office and local FAA personnel shall develop a list (Punch List) of all deficiencies (unsatisfactory work, latent or patent defects, etc.). A copy of the punch list will be furnished to the contractor as a draft list after the final inspection, while the original copy will be forwarded to the Contracting Officer. Only one official punch list shall be generated by the inspection team.

The Contracting Officer will furnish to the contractor the official punch list within fourteen calendar days after completion of the final inspection. The contractor shall be allowed 30 calendar days to correct all deficiencies noted.

1.7 ACCEPTANCE OF WORK

The contractor shall correct discrepancies noted during the final inspection, clean the premises, and notify the Resident Engineer that the work is ready for acceptance. The Resident Engineer shall verify that the official punch list has been accomplished and initialize and date each item as it is completed.

END OF SECTION 01800

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SECTION 06100- MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood grounds, nailers and blocking.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. A153: Specification for Zinc Coating (Hot-Dip) On Iron And Steel Hardware.
2. A307: Specification for Carbon Steel Bolts And Studs, 60,000 PSI Tensile Strength.
3. A563: Specification for Carbon And Alloy Steel Nuts (Metric).

B. National Institute of Standards (NIST)

1. PS 1 - U S Product Standard for Construction and Industrial Plywood.
2. PS 20 - American Softwood Lumber Standard.

C. American Wood Preservers' Association (AWPA)

1. C9 – Plywood, Pressure Treatment
2. C20 - Structural Lumber, Fire-Retardant Pressure Treatment.
2. C27 - Plywood, Fire-Retardant Pressure Treatment.
3. M4 - Standard for the Care of Preservative-Treated Wood Products.

D. Southern Pine Inspection Bureau (SPIB)

1. Standard Grading Rules for Southern Pine Lumber, 1994.

E. American Plywood Association (APA)

1. APA Product Guide.

F. Federal Standards (FS)

1. FF-N-105

1.3 SUBMITTALS

A. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
3. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.

B. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with performance requirements indicated.

C. Warranty of chemical treatment manufacturer for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
4. SPIB - Southern Pine Inspection Bureau.

C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece.

D. Sizes: Provide nominal sizes indicated, complying with PS 20 except where actual sizes are specifically noted as being required..

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C20 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

1. Do not use chemicals containing chromium or arsenic.
2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through contain colorants, or otherwise adversely affect finishes.

B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb./cu. ft. After treatment, kiln-dry lumber and plywood to maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

C. Pressure treat wood members in contact with ground with waterborne preservatives to a minimum retention of 0.40 lb./cu. ft.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated wood is indicated, comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Treatment Types: Interior Type A for protected wood and Exterior for wood exposed to weather.

B. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

2.4 BOARDS

A. Exposed Boards: Where boards will be exposed in the finished work, provide the following:

1. Moisture Content: 19 percent maximum.
2. Species and Grade: Southern pine, C Finish per SPIB rules.

B. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:

1. Species and Grade: Eastern softwoods, No. 3 Common per NELMA rules.

2.5 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items are not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A153 or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of miscellaneous carpentry and in sizes that would require an excessive number or poor arrangement of joints.

B. Cut and fit miscellaneous carpentry accurately. Install members plumb and true to line and level.

C. Coat cut edges of preservative-treated wood to comply with AWPA M4.

D. Countersink nail heads on exposed carpentry work and fill holes.

3.2 WOOD GROUNDS, NAILERS, AND BLOCKING

A. Install where shown and where required for screeding or attaching other work. Cut and shape to required size. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 06100

SECTION 07543 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically fastened TPO membrane roofing system.
2. Vapor retarder.
3. Roof insulation.

B. Verify existing metal deck is in acceptable condition to receive new roofing system. If not make repairs as necessary.

1.2 DEFINITIONS

A. TPO: Thermoplastic polyolefin.

B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-195, wind speed of 120MPH per Florida Building Code..

2. Hail Resistance: SH.

D. Energy Performance: Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products. Roofing system shall meet R-30 insulation factor.

E. Provide roofing system that complies with the South Florida Building Code for materials and installation and to comply with wind speed of 120 miles per hour.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Adhesives: Provide VOC documentation.

B. Shop Drawings: For roofing system. Include site specific plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Qualification Data: For qualified Installer, manufacturer and inspector.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

F. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.

G. Field quality-control reports.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM Approvals approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Inspector Qualifications: Provide qualifications of a roofing consultant who shall be responsible for field quality control. Inspector shall be an independent testing and field quality control

professional with a minimum 5 years experience in similar project size, complexity and system to conduct testing indicated.

D. Source Limitations: Obtain components including roof insulation and fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.

E. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with FAA, COTR, Government's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.
2. Warranty for roofing system shall be a no dollar limit for labor and materials.
3. Warranty Period: 20 years from date of Substantial Completion.
4. Under natural disaster limitations the peak wind gust at 10 meters above ground value shall be 100 mph.

B. Puncture Resistance Warranty: In addition to Special Warranty, Contractor agrees to repair and replace all or part of components of membrane roofing system caused by accidental punctures. Provide a no dollar limit, 20-year warranty.

C. One-Year Warranty Inspection: As part of the one-year warranty inspection, the COTR will conduct an infrared roof survey on any project involving a membrane roofing system. This survey will be conducted in accordance with ASTM C 1153. The Contractor shall be required to replace all damaged materials and to locate and repair sources of moisture penetration, at no additional cost to the FAA.

PART 2 - PRODUCTS

2.1 TPO MEMBRANE ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by Stevens Roofing Systems; Division of JPS Elastomerics. Other available manufacturers offering

products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle SynTec Incorporated.

2. Thickness: 80 mils, nominal with a minimum of 34 mils above scrim.
3. Exposed Face Color: White.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 45 mils thick, minimum, of same color as sheet membrane. Use 60 mil thick unreinforced thermoplastic polyolefin sheet flashing at parapet, same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard, water based. Use to be confirmed by COTR and shall have low odor.

D. Slip Sheet: Manufacturer's standard, of thickness required for application.

E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.3 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch thick.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Georgia-Pacific Corporation; Dens Deck.

2. Substrate boards shall be placed directly on metal deck with fasteners.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof

2.4 PROTECTION BOARDS

A. Protection Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 1/2 inch thick.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Georgia-Pacific Corporation; Dens Deck.

   2. Protection board shall be placed on top of rigid insulation; roof membrane shall be placed directly on protection board forming roof assembly.

2.5 VAPOR RETARDER

A. Polyethylene Film: ASTM D 4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.

   1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.6 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. Composite Polyisocyanurate Board Insulation: ASTM C 1289, with factory-applied facing board on one major surface, as indicated below by type, and felt or glass-fiber mat facer on the other.
   1. Type V, OSB facer, 7/16 inch thick.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.8 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that metal deck is acceptable for installation of roofing system.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Close all fresh air intakes/louvers where dust and odors from the roofing activities could enter the building.

E. Coordinate with the COTR the timing of the roofing removals and installation activities with the least potential for disruption of building operations.

3.3 SUBSTRATE BOARD

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.4 PROTECTION BOARD

A. Install substrate board over rigid insulation with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

3.5 VAPOR-RETARDER INSTALLATION

A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively.

1. Continuously seal side and end laps with tape.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

C. Coordinate with roofing manufacturer location of vapor retarder.

3.6 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

F. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

G. Install slip sheet over insulation and immediately beneath membrane roofing.

3.7 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

A. Mechanically fasten membrane roofing over area to receive roofing and install according to roofing system manufacturer's written instructions.

1. For in-splice attachment, install membranes roofing with long dimension perpendicular to steel roof deck flutes.

B. Start installation of membrane roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten or adhere membrane roofing securely at terminations, penetrations, and perimeter of roofing.

E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

F. In-Seam Attachment: Secure one edge of TPO sheet using fastening plates or metal battens centered within membrane seam and mechanically fasten TPO sheet to roof deck.

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

I. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weather tightness of transition.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Installation Inspections: Engage a full-time field quality control inspector during roof system installation. The field quality control inspector shall submit inspection report at weekly intervals to Contractor and COTR and coordinate with roofing system manufacturer's technical personnel and inspect roofing installation upon completion.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for

deterioration and damage, describing its nature and extent in a written report, with copies to COTR.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07543

SECTION 07600 - FLASHING & SHEET METAL

PART 1 – GENERAL

1.1 SCOPE

All flashing will be installed as part of the roofing manufacturer's approved roof system. Sheet metal work shall be accomplished to form weathertight construction. Work shall be installed without waves, warps, buckles, fastening stresses or distortion and shall allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades shall be performed by sheet metal mechanics. Exposed edges shall be hemmed. Bottom edges of exposed vertical surfaces shall be angled to form drips. Flashing at the end of a run shall be formed into a three dimensional configuration to direct water to the outside of the system. Accessories and other items essential to complete the sheet metal installation, though not specifically indicated or specified, shall be provided. Installation of sheet metal items used in conjunction with roofing shall be coordinated with roofing work to permit continuous roofing operations. Factory-fabricated components shall be packed in cartons marked with the manufacturer's name or trademark. Bulk materials from which items are field fabricated shall have manufacturer's name or trademark printed or embossed at frequent intervals to permit easy identification. In general, products that are part of the manufacuturer's approved roof membrane system are to be supplied and installed in accordance with manufacturer's installation instructions.

Requirements included - Contractor shall be responsible for all cutting, fitting and patching, required to complete the work or to:

A. Remove and replace defective work.

B. Remove and replace work not conforming to requirements.

1.2 APPLICABLE PUBLICATIONS

The following specifications and standards of the issues currently in force, form a part of this section and are applicable as specified herein.

A. Air Movement and Control Association (AMCA)

1. AMCA 500 Test Methods for Louvers, Dampers and Shutters – Latest Edition

B. American Society For Testing And Materials (ASTM)

1. ASTM A 167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip – Latest Edition
2. ASTM B 209 Aluminum and Aluminum-Alloy Sheet and Plate – Latest Edition
3. ASTM B 221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes – Latest Edition
4. ASTM B 370 Copper Sheet and Strip for Building Construction – Latest Edition

5. ASTM B 486 Paste Solder – Latest Edition
6. ASTM B 506 Copper-Clad Stainless Steel Sheet and Strip for Building Construction – Latest Edition
7. ASTM D 543 Resistance of Plastics to Chemical Reagents– Latest Edition
8. ASTM D 751 Coated Fabrics – Latest Edition
9. ASTM D 822 Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus – Latest Edition
10. ASTM D 1784 Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds – Latest Edition
11. ASTM E 96 Water Vapor Transmission of Materials – Latest Edition

C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1. SMACNA-02 Architectural Sheet Metal Manual – Latest Edition

1.3 SUBMITTALS

Submittals required include, but are not necessarily limited to, the following:

1. Sheet Metal Drawings - Drawings showing weights, gauges, or thickness of sheet metal; type of material; joining, expansion-joint spacing, and fabrication details; and installation procedures. Materials shall not be delivered to the site until after the approved detail drawings have been returned to the Contractor.

PART 2 – MATERIAL

Materials shall conform to the requirements of the roof manufacturer's approved membrane flashing system.

2.1 ALUMINUM EXTRUSIONS

ASTM B 221, Alloy 6063, Temper T5.

2.2 FASTENERS

Fasteners shall be the best type for the application.

2.3 PLASTIC HARDSETTING SEALANT

As recommended by aluminum manufacturer.

2.4 POLYVINYL CHLORIDE (PVC) REGLETS

ASTM D 1784

2.5 SHEET METAL

As recommended by roof manufacturer.

2.6 SOLDER

ASTM B 486, Alloy 50B, for use with copper and Alloy 60B for use with stainless steel

PART 3 – EXECUTION

3.1 PROTECTION OF ALUMINUM

Aluminum shall not be used where it will be in contact with copper or where it will contact water which flows over copper surfaces. Aluminum that will be in contact with wet or pressure-treated wood, mortar, concrete, masonry, or ferrous metals shall be protected against galvanic or corrosive action by one of the following methods:

A. Paint: Aluminum surfaces to be protected shall be solvent cleaned and given a coat of zinc-molybdate primer and one coat of aluminum paint.

B. Nonabsorptive Tape or Gasket: Nonabsorptive tape or gasket shall be placed between the adjoining surfaces and shall be cemented to the aluminum surface using a cement compatible with aluminum.

3.2 SOLDERING, RIVETING, SEAMING, AND SEALING

A. Soldering: Soldering shall apply to copper, copper clad stainless steel, and stainless steel items. Edges of sheet metals, except lead coated material shall be pretinned before soldering is begun. Soldering shall be done slowly with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead coated material to be soldered shall be scraped or wire-brushed to produce a bright surface and seams shall have a liberal amount of flux brushed in before soldering is begun. Edges of stainless steel to be pretinned shall be treated with soldering acid flux. Soldering shall follow immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a solution of washing soda in water and rinsed with clean water.

B. Riveting and Sealing: Joints in aluminum sheets 0.040 inch or less in thickness shall be made mechanically and sealed with the sealant specified.

C. Seams: Flat-lock and soldered-lap seams shall finish not less than 1-inch wide. Unsoldered plain-lap seams shall lap not less than 3 inches unless otherwise specified. Flat seams shall be made in the direction of the flow.

3.3 CLEATS

A continuous cleat shall be provided where indicated or specified to secure loose edges of the sheet metalwork. Butt joints shall be spaced approximately 1/8-inch apart. The cleat shall be fastened to the supporting construction with nails evenly spaced not over 12 inches on centers, unless otherwise noted. Where the fastening is to be made to concrete or masonry, screws shall be used and shall be driven in expansion shields set in concrete or masonry. The cleat for fascia anchorage shall be installed to extend below the supporting construction to form a drip and to allow the flashing to be hooked over the lower edge at least 3/4 inch. The cleat shall be of sufficient width to provide adequate bearing area to insure a rigid installation. Where horizontal nailer is vented for insulation and the cleat is placed over masonry or concrete, the cleat shall be installed over 1/16-inch thick metal washers placed at screws. Washers shall be of metal that is electrolytically compatible with the continuous cleat.

3.4 EXPANSION JOINTS

Expansion joints shall be provided at 40-foot intervals for copper and stainless steel and at 32-foot intervals for aluminum, except that where the distance between the last expansion joint and the end of the continuous run is more than half the required interval spacing an additional joint shall be provided. Joints shall be evenly spaced.

3.5 FLASHINGS

Flashings shall be installed at intersections of roof with vertical surfaces and at projections through roof, except that flashing for heating and plumbing, including piping, roof, and floor drains, and for electrical conduit projections through roof or walls is covered in appropriate sections for such work.

A. Base Flashing

Metal base flashing shall be installed at locations indicated and shall be coordinated with roofing work.

3.6 REGLETS

Reglets shall be a factory fabricated product of proven design, complete with fittings and special shapes as may be required. Open-type reglets shall be filled with fiberboard or other suitable separator to prevent crushing of the slot during installation. Reglets shall be located not less than 8 inches nor more than 16 inches above roofing not having cant strips or shall be located not less than 5 inches nor more than 13 inches above cant strip. Reglet plugs shall be spaced not over 12 inches on centers and reglet grooves shall be filled with sealant. Friction or slot-type reglets shall have metal flashings inserted the full depth of slot and shall be lightly punched every 12 inches to crimp the reglet and cap flashing together.

PART 4 – QUALITY ASSURANCE

4.1 DELIVERY, STORAGE, AND HANDLING

Materials shall be adequately packaged and protected during shipment and shall be inspected for damage, dampness, and wet-storage stains upon delivery to the jobsite. Materials shall be clearly labeled as to type and manufacturer. Sheet metal items shall be carefully handled to avoid damage. Materials shall be stored in dry, weathertight, ventilated areas until immediately before installation.

4.2 CONTRACTOR QUALITY CONTROL

The Contractor shall establish and maintain a quality control procedure for sheet metal used in conjunction with roofing to assure compliance of the installed sheet metalwork with the contract requirements. Any work found not to be in compliance with the contract shall be promptly removed and replaced or corrected in an approved manner

* * * END OF SECTION * * *

SECTION 16670 - LIGHTNING PROTECTION SYSTEM

PART-1- GENERAL

1.1 SUMMARY

A. This section includes the installation of a lightning protection system on building roof(s).

1.2 REFERENCE STANDARDS

A. National Fire Protection Association

1. NFPA 70 National Electric Code
2. NFPA 780 Standard for the installation of Lightning Protection Systems

B. Underwriters Laboratories (UL)

1. UL96A: Installation Requirements for Lightning Protection Systems

1.3 SUBMITTAL REQUIREMENTS

A. Manufacturer's Product Data:

B. Submit material specification data for products specified under PART 2 – PRODUCTS.

C. Submit shop drawings for fabrication, erection, wiring and connections to show compliance with NFPA 780 from the lightning protection manufacturer prior to installation.

D. Include plans and elevations at not less than 1/16" to 1'-0" scale with details at not less than 3" to 1'-0" scale.

E. Indicate the complete system cable routing (both horizontal and vertical), all devices, connections, bonding, penetrations, grounding and ground resistances.

F. Indicate required anchorage and accessory items, field dimensions, finishes, method of connection and routing.

1.4 CERTIFICATES:

A. Obtain and submit Installer Certification for records.

B. Obtain and submit UL listed Master Label for records.

PART-2 PRODUCTS

2.1 GENERAL:

A. Provide system material to install a lightning protection system. All material shall be labeled per UL#96A and conform with NFPA #780.

B. The installation shall be UL certified and an UL Master Label obtained and delivered to the Owner.

C. The system shall be tested for proper grounding.

2.2 MAIN ROOF CONDUCTOR:

A. Aluminum, 37 strands of 13 gauge, rope lay 190#/1000 ft.

2.3 AIR TERMINALS AND BASES:

A. Solid round aluminum rod, 5/8" diameter with blunt tip and 5/8" external thread adapter base or as noted on the plans.

B. New terminal bases shall be of cast aluminum with bolted pressure cable connections and utilize stainless steel hardware. The base-to-roof attachment shall conform to the roof construction and as noted on the plans.

2.4 BONDING PLATES:

A. Cast aluminum bonding plate with bolted pressure cable connector and stainless steel hardware. The configuration shall match the characteristics, cable arrangement and attachment required for bonding. Minimum of 8 square inches of contact area.

2.5 CABLE FASTENERS:

A. Electrically compatible with conductor material and conforming to the characteristics of the base to which it attaches.

2.6 CABLE SPLICERS AND CONNECTORS:

A. Cast aluminum, select to be electrically compatible with conductor, with bolt pressure connections and stainless steel hardware.

2.7 MANUFACTURERS

A. In order to define requirements for material specifications, and provide for total system responsibility all products shall be compatible for connections with existing as furnished by one of the following manufacturers:

1. Heary Brothers Lightning Protection, Inc.

2. Independent Protection Company, Inc.

3. Thompson Lightning Protection, Inc.

4. Robbins Lightning, Inc.

PART-3 EXECUTION

3.1 GENERAL:

A. Roof Conductor:

1. Utilize aluminum conductor.

B. Air Terminals and Bases:

1. Utilize aluminum rods.

C. Bonding Plates:

1. Provide bonding plates for cable bonding to all metallic and structural items. Materials shall be electrically compatible.

D. Cable Fasteners:

1. Provide cable fasteners to secure cables.

E. Cable Splices and Connections:

1. Provide bolt pressure cable splices and connectors for all exposed and accessible applications.

3.2 INSTALLATION

A. The system shall be installed per UL, NFPA and manufacturer's drawings, data and instructions.

B. Air Terminals:

1. Provide Air Terminals as shown on the Drawings.

C. Conductors:

1. At all connections aluminum to existing copper, bi-metal connectors shall be used. Conductors shall be coursed to interconnect all air terminals so as to provide a 2-way path to ground.

2. The angle of any turn shall not exceed 90 degrees and shall not exceed 90 degrees and shall provide a horizontal or downward path. No bend shall have a radius of less than 8".

D. Fasteners:

1. Conductors shall be secured at a maximum of 3' o.c. with appropriate fasteners for the cable size and material to which it is fastened.

E. Bonding:

1. Bond lightning protection system to all metallic objects of conductance within 6' of conductor or at above roof level with full size conductor and minimum of 3 square inch connector.

2. Bond all bodies of inductance at or below roof level within 6' of a lightning protection conductor or within 6' of another grounded body of metal.

* * * END OF SECTION * * *